

ON HYBRID FORMS IN THE GENUS SATYRIUM, WITH  
DESCRIPTIONS OF TWO NEW FORMS.

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(With Plates LI-LIIL.)

This paper is concerned chiefly with the description of what appear to be two distinct natural hybrids belonging to the genus *Satyrium*. I find that the number of hybrids previously known among *Satyrium* species in South Africa includes only those mentioned by Bolus (*Orchids of South Africa*, vol. iii, Table XXXVI), Rolfe (*Flora Capensis*, vol. v, sect. iii, p. 173), and two forms, the unpublished description of which, written by Miss Hume, I have been privileged to consult.

The first hybrid (*S. coriifolium* × *carneum*) was described and figured from three living specimens found in association with both the supposed parent forms. According to the account (*loc. cit.*) the hybrid shows the characters of one or other of the parents as far as the individual vegetative parts are concerned, and, on the whole, judging from the figures and in the absence of a detailed description, it appears that the floral structures approach those of *S. coriifolium*.

The second hybrid, considered as such by Rolfe, was described as *S. Guthreii* by Bolus, who regarded it as a species, but noted the resemblance between the column and that of *S. bicallosum*, at the same time remarking on this character as unique among species of *Satyrium*. Rolfe (*loc. cit.*) is inclined to regard it on morphological grounds as a hybrid between *S. candidum* and *S. bicallosum*, and, justifiably, supports this contention by the fact that these two species are associated in habitat.

The two forms investigated by Miss Hume were examined with reference to the spike and floral organs only. Miss Hume regards her "type A" as a clear hybrid between *S. coriifolium* and *carneum*, and considers that the hybrid nature is supported by the sterility of the ovary. She regards her "type B" as a hybrid between "type A" and *S. coriifolium*, basing her decision on the fact that the pollen in "type A" is good, and also on the morphological characters of "type B." [I understand that the detailed descriptions of these forms will be published shortly in the *Annals of the Bolus Herbarium*.]

The hybrids under description in this paper were found in each case

closely associated in habitat with the suggested parent forms. The occurrence of hybrid A was noted some four years ago on the farm Kleinberg in the Tulbagh District.

Since then I have collected specimens each year on this and neighbouring farms, and have noticed them at the Tulbagh flower shows as exhibits from various parts of the district. Apparently this form has been found more abundantly than is the case with the hybrids mentioned above.

I have made a detailed study of the form from about a dozen spikes during the present flowering season, and have had the special advantage of working on fresh material.

Specimens of hybrid B described in this paper were noted for the first time this year on the farm Kleinberg and also as exhibits at the Tulbagh flower show. The supposed parent forms were associated in abundance with the hybrid.

The hybrid nature was suggested by the intermediate nature of the size and colouring of the flower and the form of the stem sheaths. This appears to be borne out by the results of more detailed study of the floral and vegetative parts.

It will be noted from an examination of the subjoined comparative tables that in each case the hybrid is an intermediate or blend between the two suggested parent forms, both as regards vegetative and floral structures.

An attempt was made to obtain average measurements of the entire plant, spike, leaves, etc., of the parent and hybrid forms, but there is so wide a variation in the individuals of all the types that it would be misleading to quote any average figures.

Further details for the comparison of the hybrids are found in the diagrams.

The following observations on the parent forms in each case in conjunction with the natural association of the same, support the probability of the hybrid origin of the two types described:

(1) Frequency of pollination. (I have noted in numerous instances the removal of one or both pollinia and the presence of pollen on the stigmatic surfaces of the parent forms, particularly in the case of *S. erectum*.)

(2) The sweet scent of the flowers in all the parent forms concerned and especially so in the case of the inconspicuous flowers of *S. bicorne*.

(3) Presence of free honey in the spurs of all the parent forms.

(4) The long life of individual flowers.

(5) Insect pollination. (I have several times noticed insects visiting the flowers and in some cases observed pollinia attached to these insects. That this is not altogether occasional is suggested by the abundance of spiders among flowers and bracts, and some of these show a striking adaptation in colouration to that of the flowers in *S. erectum*.)

	<i>S. erectum</i> (Sw.)	<i>S. coriifolium</i> (Sw.)	Hybrid A.
Produced leaves . . .	2, adpressed to ground, cordate-orbicular or ovate acute	2-3 erect-spreading, elliptic oblong, acute	2, sub-erect, spreading broadly elliptic, acute. Intermediate between the parent forms.
Texture of produced leaves	Fleshy	Coriaceous	Less fleshy than in <i>S. erectum</i> .
Thickness of leaf near mid-rib (sections taken at about corresponding levels)	2.8 mm. { Water-storing epidermis, 1.5 mm. Chlorenchyma, 1.3 mm.	1.2 mm. { Water-storing epidermis, .7 mm. Chlorenchyma, .5 mm.	1.7 mm. { Water-storing epidermis, 1 mm. Chlorenchyma, .7 mm.
Bracts . . . . .	Reflexed, lanceolate or oblong, acute, longer than ovary	Reflexed, oblong, acuminate, longer than ovary	Intermediate between the two parent forms.
Colour of perianth	Tyrian pink, amaranth pink or light mallow purple, with aster purple mottling	a. Light cadmium b. Cadmium orange with grenadine red on back of lip and side sepals No mottling	a. Alizarine pink with old rose on hood, etc. b. Old rose and begonia rose. Mottling of acajou red and eugenia red.
Depth of lip . . .	5½ mm.	12 mm.	8 mm.
Width of lip (at widest part)	6-7 mm.	7-8 mm.	6-7 mm.
Length of lip . . .	14-16 mm.	13-14 mm.	13-14 mm.
Veining of lip . . .	2 unbranched veins on either side of mid-rib	4 unbranched veins on either side of mid-rib and one subdivided into at least 4	3-4 unbranched veins on either side of mid-rib and one subdivided in 2 or 3.
Length of spur . . .	10-12 mm.	11-12½ mm.	11 mm.
Length of side sepals	13-14½ mm.	12½ mm.	12-13 mm.
Breadth of side sepals	4-4½ mm.	4½ mm.	4-4½ mm.
Length of side petals	11-13 mm.	12-12½ mm.	12-13 mm.
Breadth of side petals	3½-4 mm.	2½-3 mm.	3-4 mm.
General shape of lip	Galeate, the mouth obovate, narrowly contracted at base	Galeate, sides almost parallel and little contracted at base, or regularly contracted from above downwards	Galeate, sides almost parallel, but distinctly contracted at base, less so than in <i>S. erectum</i> .
Rostellum . . . . .	3-denticulate	3-lobed, middle lobe longer than the others, triangular, acute	3-lobed, lobes shorter than in <i>S. coriifolium</i> .
Glands of Rostellum	Small, circular	Large, horse-shoe shaped	Intermediate in size and shape between parent forms.
Ovary . . . . .	Posterior rib present	Posterior rib absent	Posterior rib present.
Pollinia . . . . .	About 3 mm. long, including caudicle; pollen mass, 1½ mm.	4½ mm. long, including caudicle; pollen mass, 2½ mm.	4 mm. long, including caudicle; pollen mass, 2 mm. long.

	<i>S. erectum</i> (Sw.)	<i>S. bicorne</i> (Thunb.)	Hybrid <i>B.</i>
<i>Produced leaves</i>	In all three similar, fleshy	2, adpressed to ground, cordate-orbicular,	
<i>Stem sheaths</i>	Spathaceous	Broad, tubular	Distinctly intermediate between those of parent forms.
<i>Colour of perianth</i>	Tyrian pink, amaranth pink, or light mallow purple, with aster purple mottling	Pyrite yellow with very fine mottling of orange-citrine; sulphine yellow with orange-citrine mottling; garnet-brown, mottled in very dark specimens	a. Alizarine-pink with eugenia red stripe and hessian brown mottling on throat of lower lip. b. Old rose with flush of aster purple and bordeaux mottling on inside of base flower lip. c. Old rose with mottling of bordeaux. d. Alizarine pink on back of hood, old rose, grading into eugenia red on inside of perianth lobes; madder brown mottling on inside of flower lip.
<i>Width across lip (at widest part)</i>	6-7 mm.	3-4½ mm.	5-6½.
<i>Length of lip</i>	14-16 mm.	9-10 mm.	11½-13 mm.
<i>Length of spur</i>	10-12 mm.	18-22 mm.	10-15 mm.
<i>Length of side sepals</i>	13-14½ mm.	7-8 mm.	9-12 mm.
<i>Breadth of side sepals</i>	4-4½ mm.	3-4 mm.	3-4 mm.
<i>Length of side petals</i>	11-13 mm.	5-5½ mm.	9-11 mm.
<i>Breadth of side petals</i>	3½-4 mm.	2½-3 mm.	3-4 mm.
<i>General shape of flower</i>	See diagrams	See diagrams	See diagrams.
<i>Rostellum</i>	Rhomboid, 3-dentate	Broadly oblong, truncate at apex, in the middle produced into a short, linear tooth, deflexed, much shorter than stigma	More broadly oblong than in <i>S. bicorne</i> , truncate at apex, in the middle produced into a narrow tooth.
<i>Stigma</i>	Semi-orbicular	Oblong, retuse, as long as stipe of column and longer than rostellum	Shape intermediate between that of parents, shorter than stipe.

The following spiders and insects have been kindly determined by Dr. Péringuey :

*Thomisus* sp.  
*Synaema* sp.  
*Apis mellifica*, var. *caffra*.  
*Anisonyx ursus*.  
*Platychelus dimidiatus*.

In conclusion, it must be noted that fairly well advanced embryos were found in the ovaries of single specimens of each hybrid, but the significance of this in connection with what appears to be a distinctly intermediate morphological form between two good morphological species is, in the present state of our knowledge, of no deciding value.

With the object of experimenting with the parent forms I have gathered individual plants with which I have initiated experiments in cross pollination.

#### EXPLANATION OF PLATES LI—LIII.

FIG.

1. Flower and bract of *S. erectum*, front view.
2. Flower and bract of *S. coriifolium*, front view.
3. Flower and bract of *S. erectum* × *coriifolium*, front view.
4. Flower of *S. erectum*, side view from one aspect.
5. Flower of *S. coriifolium*, side view from one aspect.
6. Flower of *S. erectum* × *coriifolium*, side view from one aspect.
7. Flower of *S. erectum*, side view from another aspect.
8. Flower of *S. coriifolium*, side view from another aspect.
9. Flower of *S. erectum* × *coriifolium*, side view from another aspect.
10. Lip of *S. erectum*, side view.
11. Lip of *S. coriifolium*, side view.
12. Lip of *S. erectum* × *coriifolium*, side view.
13. Lip of *S. erectum*, front view.
14. Lip of *S. coriifolium*, front view.
15. Lip of *S. erectum* × *coriifolium*, front view.
16. Sepals and side petals of *S. erectum*, showing mottling.
17. Sepals and side petals of *S. coriifolium*.
18. Sepals and side petals of *S. erectum* × *coriifolium*, showing mottling.
19. Ovary and column of *S. erectum*, side view.
20. Ovary and column of *S. coriifolium*, side view.
21. Ovary and column of *S. erectum* × *coriifolium*, side view.
22. Column of *S. erectum*, side view.
23. Column of *S. coriifolium*, side view.
24. Column of *S. erectum* × *coriifolium*, side view.
25. Column of *S. erectum*, front view; glands in position.
26. Column of *S. coriifolium*, front view; glands in position.

} Drawn by Mrs. All-  
 port.

27. Column of *S. erectum* × *coriifolium*, side view; glands in position.
28. Column of *S. erectum*, front view; glands removed.
29. Column of *S. coriifolium*, front view; glands removed.
30. Column of *S. erectum* × *coriifolium*, front view; glands removed.
31. Pollinium of *S. erectum*.
32. Pollinium of *S. coriifolium*.
33. Pollinium of *S. erectum* × *coriifolium*.
34. Transverse section of ovary of *S. erectum*.
35. Transverse section of ovary of *S. coriifolium*.
36. Transverse section of ovary of *S. erectum* × *coriifolium*.
37. Flower and bract of *S. bicornis*, front view.
38. Flower and bract of *S. erectum* × *bicornis*, front view.
39. Flower of *S. bicornis*, side view from one aspect.
40. Flower of *S. erectum* × *bicornis*, side view from one aspect.
41. Flower of *S. bicornis*, side view from another aspect.
42. Flower of *S. erectum* × *bicornis*, side view from another aspect.
43. Lip of *S. bicornis*, side view.
44. Lip of *S. erectum* × *bicornis*, side view.
45. Lip of *S. bicornis*, front view.
46. Lip of *S. erectum* × *bicornis*, front view.
47. Sepals and side petals of *S. bicornis*.
48. Sepals and side petals of *S. erectum* × *bicornis*, showing mottling.
49. Ovary and column of *S. bicornis*, side view.
50. Ovary and column of *S. erectum* × *bicornis*, side view.
51. Column of *S. bicornis*, side view.
52. Column of *S. erectum* × *bicornis*, side view.
53. Column of *S. bicornis*, front view; glands in position.
54. Column of *S. erectum* × *bicornis*, front view; glands in position.
55. Column of *S. bicornis*, front view; glands removed.
56. Column of *S. erectum* × *bicornis*, front view; glands removed.